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IMPACT OF SUB-DIMENSIONS OF LIFE INDEX OF CITIES ON THE EDUCATION INDEX

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ABSTRACT

In this study which is named as Impact of Sub-dimensions of life index of cities on the Education Index, it is aimed to measure the impact of education index values of cities in Turkey on the environment, health, social life, safety and working life indices which form the sub-dimensions of life indices of cities, by using oridnal logistic regression analysis. As a result of the analysis, it is found out that education index values are influenced by health, working and social life index values.

INTRODUCTION:

Even though life satisfaction or happiness is one of the important discussion topics of philosophy, in 20th century as the defining and measurement problems are eliminated, it also began to be evaluated by social science branches such as sociology, psychology, and economics. Life satisfaction is used to mean that a person evaluates his life in a positive way as a whole. In literature, life satisfaction is generally used as having same meanings with "subjective or declared happiness" and "subjective welfare" (Gürsakal and Öngel, 2008: 2). Happiness, good living, or life satisfaction, is a wide concept covering the situation where people can live their daily lives as they wish and where they can have opportunities to realize it, as not being limited with the benefits obtained from consumption of commodities and services (especially with respect to physical, psychological particulars and social relations). One of the particulars covered by this concept is the satisfaction derived from education services and opportunities.

Education is a versatile process and it is influenced by various communal factors. Among these, the major factors could be listed as family, population, economy, communal values, unemployment, and immigration. While these factors influence education, education also influences the development process of these factors. Education which is under the influence of various economic, social, and cultural conditions, changes within time from region to region and from community to community. While increase in population, changes in family structure, problems and opportunities arising as a result of immigration from villages to cities, changes and renewal of traditions, customs, and habits, can explain education, they form the communal facts which should not be neglected. All these reveal the fact that education is in interaction with so many different communal factors.

Education plays a key role for providing the necessary information, skills, and competency to enable people to participate in the community and economy in an efficient way. In addition, education makes positive contribution to people's lives in areas such as health, civil participation, having interest in politics, and happiness. Studies show that educated people live much longer, that they participate more effectively in politics and the community where they live, that they commit less crimes, and that they need less social aids. There are important indicators revealing that there is a positive relationship between the quality of education people get and the quality of life they live through. For this reason, in the study it is aimed to analyse the relation between sub-dimensions of life index of cities in Turkey and education index. In recent years, studies which are conducted as relating with education satisfaction are increasing. Some of the studies made as being stated in literature are given below.

Selim (2009), has investigated the factors influencing the level of satisfaction from education systems in countries, which are candidates to be members of European Union in year 2004. In the study, by using Euro-barometer 2004.1 data set, ordinal logit-model predictions have been obtained.

In his study, Erilli (2014) has aimed to classify the districts as per their level of advancement by means of socioeconomic indicators, by using blurred grouping C-averages method.

In the study they conducted, Sakarya and İbişoğlu. (2015) have investigated socioeconomic development index that is made in year 2011 in Turkey by using regression model based on geographic particulars and they have compared growth, development, and socioeconomic development concepts.

In their study, Sezer and Arslan (2016) have got the user opinions regarding physical environmental quality of internal spaces in the buildings of 2 different engineering divisions that are situated in Uludag University Gorukle Campus and they have evaluated them.

In the study they realized in 2017, Uysal et al have conducted grouping analysis and discriminant analysis with the aim to determine whether the cities in Turkey show similarities or differences as per the life index values in Turkey or not.

In the study that is conducted by Alpaygut (2017), data obtained from a research with the aim to measure the level of satisfaction of parents of students from a private elementary school providing education services, have been analyzed and they were divided as per factors and later on, the weights of factors were determined by using Structural Equation Model (SEM).

In this study, index indicators that are formed as based on 27 out of 41 indicators that are related with 6 (working life, health, education, environment, safety and social life) out of 11 dimensions such as residence, working life, income and wealth, health, education, environment, safety, civil participation, having access to infrastructure services, social life, and life satisfaction which are gathered and used by TUIK in the study of "Life Index for the Cities" in year 2015, have been used. It is considered that sub-indices forming the life index in the cities are in interaction with each other. By starting out with this opinion in this study it is aimed to measure the interaction of education index values of cities in Turkey with the environment, health, social life, safety and working life indices of the relevant cities. For measuring this interaction, ordinal logistics regression analysis which is used in the modelling of variables that are made categorical and hierarchical have been used.

MATERIALS AND METHODS:

Logistic Regression Analysis:

Logistic regression analysis is used with the aim to create a model for the relation between categorical dependent variable and categorical or continuous independent variable(s). In logistic regression analysis, primary purpose is to predict the relation(s) between dependent variable and independent variable(s) and second purpose is to divide observations into groups. For dividing observations into groups, grouping analysis, discriminant analysis and logistic regression analysis are used. In grouping analysis, number of groups that fit to the data is not known. Observations are divided into groups according to distance or similarity measures. In discriminant and logistic regression analysis, as being different from grouping analysis, number of groups fitting to the structure of data is not known and by using these data, a discrimination model is being obtained (Karagöz, 2016). In discriminant analysis, it is required for the independent variables to fit to the normal distribution and for the covariances to be equal at each group level. In logistic regression analysis, there are no assumptions. Since the dependent variable in logistic regression analysis is a variable with nominal scale, it can not meet the condition of normal distribution and therefore, predictions are made according to Ordinary Least Squares Technique (OLS). In this situation, parameters are predicted by using Maximum Likelihood (ML) technique which is an iterative method (Kalaycı, 2008). Fundamental of logistic regression model is based on odds ratio. Odds ratio is obtained by taking the ratio of probability of occurrence of an event to the probability of non-occurrence of the event (Karagöz, 2016). Multinomial Logistic Regression Model is obtained by natural logarithm (logit transformation) of odds ratio as it can be seen in Equation 1 section.

$$L = ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + + \beta_P X_P \quad (1)$$

Equation 1, defines natural logarithm of odds ratio as the linear function of independent variables. In logistic regression model, interpretation of parameters is done by calculating the values of Exp (β). Exp (β), defines how many more times Y variable can be observed with the influence of Xp variable (or % ratio of it) (Karagöz, 2016).

Logistic regression analysis is divided into three sections as per the measurement level of dependent variable. If dependent variable has a structure that contains two sets of answers, Binary Logistic Regression is used; if dependent variable has at least three categories and if there is no superiority among them, Multinomial Logistic Regression is used and if dependent variable has at least three categories and if it is ordinal with scale, Ordinal Logistic Regression Analysis will be used. As Ordinal Logistic Regression is used in the study, it is tried to explain this analysis in a brief way.

Ordinal Logistic Regression Analysis:

Just like the other regression models, ordinal logistic regression analysis aims to reveal the cause and effect relationship by modelling the relation between dependent variable and the independent variable or variables. In these models, dependent variable should be measured with an ordinal scale type having at least three categories. For example when development levels of cities are considered, they are categorized as not developed, intermediate developed, and developed ones. The important point here is to realize sorting from smallest to biggest or from less to the plenty one. Depending on the increase in sorting, the score that will be given should increase (Karagöz, 2016). There are basically 3 features of ordinal logistic regression analysis. First feature is that categorical and ordinal measured dependent variable is a variable that can be rearranged from a non-observed continuous latent variable. However, it is not specific whether the distances between categories of dependent variable are equal or not. Second feature is that logistic regression model uses a connection function to explain the relationship between the variables and there are no assumptions in the model. Last feature is that logistic regression model assumes that the relationship between independent variables and ordinal dependent variable is independent from categories of dependent variable (Chen & Hughes, 2004).

Ordinal logistic regression model is based on the assumption that there is a "Y" latent variable that is continuous, non-observable and random under the categorical dependent Y variable (Yakut, Gündüz, & Demirci, 2015). Under this assumption, most general form of this assumption should be as stated in equation 2.

$$Y^* = \sum_{k=1}^{K} \hat{b}_k X_k + \varepsilon \qquad k = 1,2,\dots,K \quad (2)$$

In Equation 2, X independent variables vector denotes number of independent variables in k model and ε denotes the failure term. If it is considered that dependent variable has J number of ordinal categories, relationship between observed Y variable and non-observable Y variable is given in Equation 3.

$$\begin{array}{ll} Y_{(j=0)i}=0, & Y^* \le \mu_0 (=0) \\ Y_{(j=1)i}=1, & \mu_0 < Y^* \le \mu_1 \\ Y_{(j=2)i}=2, & 1 < Y^* \le \mu_2 \\ \vdots & \vdots \\ Y_{(j=J)i}=2, & \mu_{J-1} < Y^* \end{array} \quad (3)$$

In Equation 3 i, denotes observations and (i = 1,2,…,N) and J (j=0,1,…,J) denote layer numbers of dependent variables. Here μ values are threshold parameters that separate categories of dependent variables from each other (Powers & Xie, 2000). In ordinal logistic regression model, probabilities are found by using Equation 4.

$$P(y = j) = F\left[\mu_j - \sum_{k=1}^{K} \hat{b}_k x_k\right] - F\left[\mu_{j-1} - \sum_{k=1}^{K} \hat{b}_k x_k\right] \quad (4)$$

In Equation 4, probability for the observed y value to fall in jth category is being demonstrated in general (Akkuş, Türkan, & Tatlıdil, 2010). In this Equation, F denotes distribution function of failure term which is assumed to be distributed logistically (Chen & Hughes, 2004). In order to predict ordinal logistic model, there are various connection functions which are the transformation of cumulative probabilities. It is decided on which of these connection functions to use, by investigating the cumulative probability values of categories. If sudden changes occur in the cumulative probability values of categories, probit and logit functions are the best alternatives, if sudden changes take place and for example, if a slow increase takes place in cumulative probability value starting from the first category, if a sudden increase takes place in cumulative probability value towards high categories, loglog connection function is the best alternative. If the opposite of this situation takes place, negative connection function could be preferred (Şerbetçi & Özçomak, 2014).

In ordinal logistic regression model, A denotes logistic distribution and probability for the observations to fall in dependent variable categories is as it is shown in Equation 5 (Akkuş, Türkan, & Tatlıdil, 2010).

$$\begin{array}{l} P(y=0) = \Lambda\left[\mu_0 (=0) - \sum_{k=1}^{K} \hat{b}_k x_k\right] = \Lambda\left[-\sum_{k=1}^{K} \hat{b}_k x_k\right] \\ P(y=1) = \Lambda\left[\mu_1 - \sum_{k=1}^{K} \hat{b}_k x_k\right] - \Lambda\left[-\sum_{k=1}^{K} \hat{b}_k x_k\right] \\ P(y=J) = 1 - \Lambda\left[\mu_{J-1} - \sum_{k=1}^{K} \hat{b}_k x_k\right] \end{array} \quad (5)$$

In ordinal logistic regression models, the most important assumption is the assumption of parallel curves. This assumption considers that the regression coefficients that are specified are equal in all categories of ordinal categorical variable. Thus, the relationship between independent variables and dependent variable does not show variation as per the categories of dependent variable and predictions of parameters do not change as per break points (Karagöz, 2016). For the reliability and interpretability of ordinal logistic regression model, it is required for parallel curves assumption to be provided. In order to test the assumption of parallel curves, probability ratio or Wald chi-square tests are used (Şerbetçi & Özçomak, 2014). Hypothesis that are formed for these tests are as given below;

H_0= Related regression coefficients are same in all categories of dependent variable (Parameter predictions pass from the same cutting point).

H_a= Related regression coefficients are different in all categories of dependent variable (Parameter predictions pass from the different cutting points).

After providing the assumption of parallel curves, it is required to test the convenience of model. For investigating the compliance wellness of model, Pearson chi-square and deviation values are used. For investigating the compliance wellness of model, so called (Pseudo) R2 values are also used. The values show percentage of dependent variable that is explained with independent variables. However, since these values are not good criterion for logistic regression, in the analysis low values are obtained and definite results are not provided. As the so called R2 values, Cox and Snell, Nagelkerge and Mc Fadden statistics are used. After making these investigations, it is required to evaluate meaningfulness of parameters of model that are obtained. For testing the meaningfulness of parameters, Wald test is used. For interpreting the parameter, odds ratios are used (Karagöz, 2016).

RESULTS:

In 2015, TUIK has presented the dimensions, that are represented by 41 indicators as including 11 dimensions such as residence, working life, income and wealth, health, education, environment, safety, civil participation, having access to infrastructure services, social life, and life satisfaction, within a single compound index structure (Life index in cities). Data which are used in calculating index values are gathered from 81 cities by using Statistical Regional Unites Classification (IBBS3). Index values range between 0 and 1 and as they approach to 1, they define a better life standard. For normalizing the indicators in "Life index for cities", min-max method is used. In the index calculation, TUIK has weighted the dimensions as per the hierarchical equal weighting method. In this study, data of "Life index in cities" of TUIK for year 2015 have been used (TUIK, 2016 b, online: http://www.tuik.gov.tr/VeriBilgi.do?alt_id=1106).

Variables:

Life Index in Cities that is calculated by TUIK in year 2015 is a composite index that is formed with objective and subjective indicators. For determining the dimensions and indicators in their study, TUIK has taken criteria of OECD within the frame of "Better Living Index" and the criteria that are appropriate for conditions in Turkey as basis.

Within this context, explanations relating with dimensions regarding "Life Index in Cities" that is also used in this research are stated below (TUIK, 2016 a: 3-10, on line: http://www.tuik.gov.tr/HbGetir.do?id=24561&tb_id=4).

1. **Working Life:** Working life dimension is represented with four indicators: Employment ratio, Unemployment rate, Average daily earning, Job satisfaction ratio.

2. **Health:** Health dimension is represented with five indicators in total: Death rate of babies, Life period expected from birth, Number of applications per doctor, Satisfaction ratio of public from health services.

3. **Education:** Education dimension is represented with five indicators: Net schooling rate in preschool education period (3-5 years of age), Average score as being basis for placement as per TEOG system, Average score in YGS, Ratio of faculty or high school graduates, Satisfaction ratio of public from education services.

4. **Environment:** Environment dimension is represented with five indicators: Average of PM10 station values (air pollution), Forest area per km2, Population ratio for which waste service is provided, Ratio of those experiencing noise problem as originating from the streets, Rate of Satisfaction from cleaning services provided by municipality.

5. **Security:** Security dimension is represented with four indicators: Ratio of murders (per one million people), Number of traffic accidents resulting with death incidents or injuries (per one thousand people), Ratio of those feeling

secure when walking alone in the night time, Satisfaction ratio from public security services.

6. **Social Life:** Social life dimension is represented with four indicators: Number of cinema and theater spectators (per hundred people), Area of shopping centers per one thousand people, Satisfaction ratio from social relations, Satisfaction ratio from social life.

It is considered that the dimensions which are used in the calculation of Life Index in Cities are in interaction with one another. In this study, interaction of education index values of cities with environment, health, social life, security, and working life indices will be measured. For this measurement, ordinal logistic regression analysis has been applied.

Index variables which are obtained by TUIK have values ranging between 0 and 1. As it is known, in order to apply ordinal logistic regression analysis, it is required for the dependent variable to be ranked in hierarchical structure. Index variables that will be used in this study for this purpose have been transformed as 1, 2, 3, 4 and 5 as being categorical and hierarchical, whereas cities ranging between 0 and 0,20 are denoted as 1 and cities ranging between 0,2001 and 0,40 are denoted as 2. Starting from this point of view, it could be stated that cities which are coded as 1 are "very bad" for the index, and that cities that are coded as 2 are "bad", that cities coded as 3 are "intermediate", that cities coded as 4 are "good" and that cities coded as 5 are "very good". In the way they are made categorical for the indices that are used in the study, cities in each category are shown in Table 1.

When Table 1 is investigated, it is seen that cities with lowest values in working life index are Batman, Mardin, Siirt and Şırnak. However, for this index there are no cities that are in "very good" category. When health index is investigated, while Ağrı, Kilis, Mardin, Muş, Şırnak and Van are determined as the cities in "bad" category, Bolu and Isparta have been determined as cities in "very good" category. When education index is investigated, it is seen that cities of Hakkari and Şırnak are in the "very bad" category and that when environment index is investigated, city of Igdir is in "very bad" category and that when social life index is investigated, cities of Mardin and Şırnak are in "very bad" category. On the other hand, it could be stated that for the environment index, city of Kastamonu has "very good" index values and that for the security index, city of Artvin has "very good" index values.

Table 1. Distribution of cities in the indices used as per categories

Categories	1	2	3	4	5
Working Life	Batman, Mardin, Siirt, Şırnak	Adıyaman, Bitlis, Diyarbakır, Hakkari, Hatay, Kilis, Osmaniye, Şanlıurfa, Van	Adana, Ağrı, Ankara, Ardahan, Bayburt, Bingöl, Çanakkale, Çankırı, Çorum, Düzce, Edirne, Elazığ, Erzurum, Eskişehir, Gaziantep, Giresun, Iğdır, İzmir, Kahramanmaraş, Kastamonu, Kayseri, Kırşehir, Malatya, Mersin, Muş, Nevşehir, Niğde, Ordu, Samsun, Sivas, Tokat, Trabzon, Tunceli, Yalova, Yozgat	Afyonkarahisar, Aksaray, Amasya, Antalya, Artvin, Aydın, Balıkesir, Bartın, Bilecik, Bolu, Burdur, Bursa, Denizli, Erzincan, Gümüşhane, Isparta, İstanbul, Karabük, Karaman, Kars, Kırıkkale, Kırklareli, Kocaeli, Konya, Kütahya, Manisa, Muğla, Rize, Sakarya, Sinop, Tekirdağ, Uşak, Zonguldak	
Health		Ağrı, Kilis, Mardin, Muş, Şırnak, Van	Adana, Adıyaman, Aksaray, Amasya, Ardahan, Bartın, Batman, Bayburt, Bilecik, Bingöl, Bitlis, Burdur, Çorum, Diyarbakır, Gaziantep, Hakkari, Hatay, Iğdır, Kars, Kastamonu, Kırklareli, Kocaeli, Mersin, Osmaniye, Siirt, Sinop, Şanlıurfa, Tekirdağ, Tunceli, Zonguldak	Afyonkarahisar, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bursa, Çanakkale, Çankırı, Denizli, Düzce, Edirne, Elazığ, Erzincan, Erzurum, Eskişehir, Giresun, Gümüşhane, İstanbul, İzmir, Kahramanmaraş, Karabük, Karaman, Kayseri, Kırıkkale, Kırşehir, Konya, Kütahya, Malatya, Manisa, Muğla, Nevşehir, Niğde, Ordu, Rize, Sakarya, Samsun, Sivas, Tokat, Trabzon, Uşak, Yalova, Yozgat	Bolu, Isparta
Education	Hakkari, Şırnak	Ağrı, Ardahan, Batman, Bitlis, Diyarbakır, Iğdır, Kars, Mardin, Muş, Şanlıurfa, Van	Adana, Adıyaman, Afyonkarahisar, Aksaray, Ankara, Artvin, Bartın, Bayburt, Bingöl, Çankırı, Çorum, Düzce, Elazığ, Erzurum, Gaziantep, Gümüşhane, Hatay, İstanbul, Kahramanmaraş, Kastamonu, Kayseri, Kırıkkale, Kilis, Kocaeli, Konya, Malatya, Manisa, Niiğde, Ordu, Osmaniye, Sakarya, Siirt, Sivas, Tekirdağ, Yozgat, Zonguldak	Amasya, Antalya, Aydın, Balıkesir, Bilecik, Bolu, Burdur, Bursa, Çanakkale, Denizli, Edirne, Erzincan, Eskişehir, Giresun, Isparta, İzmir, Karabük, Karaman, Kırklareli, Kırşehir, Kütahya, Mersin, Muğla, Nevşehir, Rize, Samsun, Sinop, Tokat, Trabzon, Tunceli, Uşak, Yalova	
Environment	Iğdır	Adıyaman, Ağrı, Batman, Hakkari, Kars, Muş, Siirt	Afyonkarahisar, Aksaray, Ankara, Ardahan, Bartın, Bayburt, Bingöl, Bitlis, Bursa, Diyarbakır, Düzce, Edirne, Elazığ, Erzincan, Erzurum, Gümüşhane, Kahramanmaraş, Kayseri, Kilis, Mardin, Nevşehir, Niğde, Osmaniye, Şanlıurfa, Şırnak, Van, Yozgat	Adana, Amasya, Antalya, Artvin, Aydın, Balıkesir, Bilecik, Bolu, Burdur, Çanakkale, Çankırı, Çorum, Denizli, Eskişehir, Gaziantep, Giresun, Hatay, Isparta, İstanbul, İzmir, Karabük, Karaman, Kırıkkale, Kırklareli, Kırşehir, Kocaeli, Konya, Kütahya, Malatya, Manisa, Mersin, Muğla, Ordu, Rize, Sakarya, Samsun, SİnOp, SİvAs, Tekirdağ, Tokat, Trabzon, Tunceli, Uşak, Yalova, Zonguldak	Kastamonu

Seurity		Muğla	Adana, Ağrı, Ankara, Antalya, Aydın, Batman, Çorum, Denizli, Diyarbakır, Düzce, Eskişehir, Gaziantep, Hakkari, Hatay, İstanbul, İzmir, Karaman, Kars, Kayseri, Kilis, Kocaeli, Mersin, Muş, Nevşehir, Osmaniye, Şırnak, Tekirdağ, Tunceli, Van, Yalova	Adıyaman, Afyonkarahisar, Aksaray, Amasya, Ardahan, Balıkesir, Bartın, Bayburt, Bilecik, Bingöl, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çankırı, Edirne, Elazığ, Erzincan, Erzurum, Giresun, Gümüşhane, Iğdır, Isparta, Kahramanmaraş, Karabük, Kastamonu, Kırıkkale, Kırklareli, Kırşehir, Konya, Kütahya, Malatya, MAnisa, Mardin, Niğde, Ordu, Riza, Sakarya, Samsun, Siirt, S,nop, Sivas, Şanlıurfa, Tokati Trabzon, Uşak, Yozgat, Zonguldak	Artvin
Social Life	Mardin, Şırnak	Adana, Adıyaman, Ağrı, Antalya, Ardahan, Batman, Bayburt, Bingöl, Bitlis, Burdur, Çorum, Diyarbakır, Elazığ, Gümüşhane, Hakkari, Hatay, Iğdır, Karaman, Kars, Kayseri, Kilis, Muş, Nevşehir, Niğde, Ordu, Osmaniye, Rize, Siirt, Sivas, Şanlıurfa, Tunceli, Van, Yozgat, Zonguldak	Afyonkarahisar, Aksaray, Amasya, Artvin, Aydın, Balıkesir, Bartın, Bilecik, Bursa, Çanakkale, Çankırı, Denizli, Düzce, Edirne, Erzincan, Erzurum, Gaziantep, Giresun, İzmir, Kahramanmaraş, Karabük, Kastamonu, Kırklareli, Kırşehir, Kocaeli, Konya, Malatya, Manisa, Mersin, Muğla, Samsun, Sinop, Tekirdağ, Tokat, Trabzon, Yalova	Ankara, Bolu, Eskişehir, Isparta, İstanbul, Kırıkkale, Kütahya, Sakarya, Uşak	

After determining the education index categories that will be used as dependent variable, it is passed on to the stage of establishing the model. For testing whether it is appropriate to use the model in predictions or not, model fitting information is used. Values relating with this test are shown in Table 2. By testing, comparison of model that does not have any explanatory variables with the model having explanatory variables is made. Since p-value is found out to be less than 0,05 for chi-square statistic that is calculated, it is decided that it is not appropriate to use the model for predictions.

Table 2. Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	147,002			
Final	69,480	77,523	16	0,000

Link function: Logit.

Goodness of fit test, with which it is tested whether the observed data are appropriate for the fitted model or not, is given in Table 3.

Table 3. Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	71,207	104	0,994
Deviance	49,804	104	1,000

Link function: Logit.

In goodness of fit test, it is revealed that null hypothesis data fully comply with the model. Starting from this point, it could be stated that null hypothesis has been accepted as per the result of Pearson chi-square test, and that the data fit to the model and that the model that is established is a good model.

Certainty coefficient R-Square which is the indicator showing percentage of change in dependent variable of model in linear regression that is explained by independent variables, can not be used in alternative regression methods. Instead of this, Pseudo R-Square values are used. Among these, most widely used ones are Cox and Snell R-Square, Nagelkerke R-Square and McFadden R-Square values. While the calculated values of Pseudo R-Square are not interpreted in percentage values, it is desired for them to have high values in the studies.

Table 4. Pseudo R-Square

Cox and Snell	0,616
Nagelkerke	0,695
McFadden	0,439

Pseudo R-Square values which are calculated for this study are shown in Table 4. Cox and Snell R-Square value has been calculated as 0,616, Nagelkerke R-Square value has been calculated as 0,695 and McFadden R-Square value has been calculated as 0,439.

In the next stage of the study, parameter predictions have been made and their results are given in Table 5.

Table 5. Parameter Estimates

		Estimate	Std. Error	Wald	e^{β}	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[education = 1,00]	-20,292	4,467	20,640		0,000	-29,046	-11,538
	[education = 2,00]	-16,151	4,243	14,492		0,000	-24,467	-7,836
	[education = 3,00]	-10,982	4,386	6,271		0,012	-19,578	-2,386
Location	[environment=1,00]	-3,596	3,881	0,858		0,354	-11,203	4,011
	[environment=2,00]	-3,142	3,267	0,924		0,336	-9,546	3,263
	[environment=3,00]	0,176	3,013	0,003		0,953	-5,729	6,081
	[environment=4,00]	2,475	3,008	0,677		0,411	-3,421	8,371
	[environment=5,00]	0[a]	,	,		,	,	.[a]
	[health=2,00]	-19,145	1,438	177,1	4,85e-09	0,000	-21,964	-16,326
	[health=3,00]	-19,214	0,715	723,1	4,52e-09	0,000	-20,615	-17,814
	[health=4,00]	-17,781	0,000	,		,	-17,781	-17,781
	[health=5,00]	0[a]	,	,		,	,	.[a]

Location	[sociallife=1,00]	-6,899	3,703	3,470	0,001	0,062	-14,158	0,360
	[sociallife =2,00]	0,681	1,070	0,405		0,524	-1,415	2,777
	[sociallife =3,00]	1,740	0,980	3,153	5,697	0,076	-0,181	3,661
	[sociallife =4,00]	0[a]	,	,		,	,	.[a]
	[security=2,00]	20,526	7870,147	0,000		0,998	-15404,678	15445,730
	[security =3,00]	4,380	3,055	2,055		0,152	-1,608	10,368
	[security =4,00]	4,485	3,019	2,207		0,137	-1,432	10,402
	[security =5,00]	0[a]	,	,		,	,	.[a]
	[workinglife=1,00]	1,111	1,969	0,318		0,573	-2,749	4,971
	[workinglife=2,00]	-2,549	1,207	4,463	0,078	0,035	-4,914	-0,184
	[workinglife=3,00]	-0,578	0,639	0,818		0,366	-1,830	0,674
	[workinglife=4,00]	0[a]	,	,		,	,	.[a]

Link function: Logit.
a. This parameter is set to zero because it is redundant.

When findings relating with model predictions are investigated, education variable that is determined as dependent variable has been found to be statistically meaningful for all categories. When independent variables are investigated, final category relating with each independent variable has been determined as reference category. It is required for the categories which are found to be meaningful, to be interpreted as per reference category of the relevant variable. In the study, it is determined that 2nd and 3rd categories were statistically meaningful for the health variable and that 1th and 3rd categories were statistically meaningful for social life variable and that 2nd category was statistically meaningful for working variable.

In ordinal regression, interpretation of coefficient is done as being different from OLS regression. In order for this interpretation to be made, it is required for the coefficients to be transformed with e^β. In Table 5 e^β transformations which are made for interpreting the coefficients that are found to be meaningful are shown. Accordingly, a decrease in health index value also causes a decrease in education index value. In other words, a decrease in health value has reducing impact on the education value. On the other hand, the situation where health index category is 2 can be shown as the category causing maximum decrease in education for the relevant variable. Accordingly, it could be stated that decrease in health levels in the cities has a reducing impact on education. When social life variable is investigated, it could be stated that the situation where social life gets to the minimum level has a reducing impact on education. On the other hand, it could be stated that when group, the social living standard of which is determined as 3, is compared with the group, the social living standard of which is determined as 4 with respect to the education levels, it has an impact that is 5,697 times more. It could be stated that working index has a reverse relation with education. It is observed that those with index group 2 has an reducing impact on education index that is 0,078 times more, when compared with work index group 54.

In order for ordinal regression analysis to be applied and interpreted, it is required to meet Parallel Lines assumption. Chi-square value that is calculated for investigating this test is shown in Table 6.

Table 6. Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	69,480			
General	53,120	16,360	32,000	0,990

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a]
a. Link function: Logit.

Hypothesis which will be used for testing this assumption will be as stated below. (Yavuz, Deveci, Karabulut, & Şentürk, 2014, s.107).

H_0: Parameter predictions pass from the same intersection point.

H_1: Parameter predictions pass from different intersection points.

When the calculated values that are shown in Table 6 are investigated, it could be stated that zero hypothesis has been accepted and that parameter predictions passed from the same intersection point and that assumption of parallel lines has been met.

CONCLUSION:

With the "Life Index in the Cities" that is first made in 2015 by Turkish Statistical Institution, it was enabled to investigate the lives of individuals and households in Turkey as per objective and subjective dimensions and to make comparisons. By means of this index being composed of 41 indicators and 11 dimensions, it was enabled to compare livability standards of cities with each other and to reveal their deficient and strong aspects with respect to each other. Furthermore, it is considered that these indices are in interaction with each other. Starting from this point, 6 of the 11 dimensions that are used in the calculation of Life Index have been evaluated and the impact of working life, health, environment, security and social life indices on education index has been investigated.

Education level of cities will have an influence on the development level of relevant cities. Therefore, it could be stated that in the cities where education index level is high, various factors depending on education will also show an increase in the positive direction. Thus, there is a linear relation between the quality of education people get and the quality of their lives.

In this study it is determined that education index values is influenced from health, social life, and working index values. A reducing impact is seen on education index for the cities, the health index value of which is categorized as "intermediate" when compared with cities, health index value of which is categorized as "very good". Starting from this point, it is seen that education index values of cities, the health index values of which are low, are also low. Similarly, it is determined that there is a reducing impact on education level for the cities, working life index of which is categorized as "bad", when compared with cities, working life index of which is categorized as "good". When the result relating with social life index is investigated, a different interpretation is revealed. While it was expected that increase in social life index value would have an increasing impact on education index, the opposite situation was observed and it was observed that cities, the social life indices of which were at "intermediate" level had an increasing impact on education level that was 6 times more when compared with cities, social life indices of which were categorized as "good".

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